

Geotechnical Laboratory
PO Box 4339
1570 Bear Creek Road
Oak Ridge TN 37830
(865) 482-6497

CERTIFICATE OF ANALYSIS

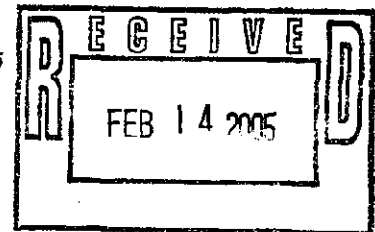
Stephen Trent
Fluor Hanford, Inc.
825 Jadwin Avenue
Richland, Washington 99352

February 10, 2005

This is the Certificate of Analysis for the following samples:

Shaw Project ID:
Shaw Project Number:
Client Sample Data Group:
Date Received by Lab:
Number of Samples:
Sample Type:

Eberline - Hanford
100846.50000000 9/23/05
H2914 H2910 Daynes
December 28, 2004
One (1)
Soil



I. Introduction/Case Narrative

One soil sample was received by the Shaw Geotechnical Laboratory on December 28, 2004. The sample was submitted for determination of bulk density, sieve analysis, hydraulic conductivity, specific gravity, and calcium carbonate content. The sample number received was B1BR60.

Please see Appendix A, Sample Number Cross Reference List; Appendix B, Analysis Results; and Appendix C, Chain-of-Custody/Sample Receipt Records.

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Reviewed and Approved:

Ralph Cole
Laboratory Manager, Geotechnical Services

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II. Analytical Results/Methodology

REFERENCES: United States Army Corps of Engineers (USACE), Engineer Manual 1110-2-1906, *Laboratory Soils Testing*, appendix II, 1970; United States Environmental Protection Agency, SW846, *Test Methods for Examining Solid Waste, Physical/Chemical Methods*, 3rd ed., Nov 1986 (EPA SW-846). Annual Book of ASTM Standards, Section 4, Construction, Volume 04.08, *Soil and Rock (I)*, and Volume 04.09, *Soil and Rock (II)*, 2004. Shaw Environmental and infrastructure, Standard Operating Procedures.

Moisture Content of Soil and Rock.....	ASTM D 2216
Bulk Density of Soils.....	EM 1110-2-1906
Particle-size Analysis of Soils	ASTM D 422
Hydraulic Conductivity of Porous Materials Using a Flexible Wall Permeameter	ASTM D 5084
Specific Gravity of Soil.....	ASTM D 854
Calcium Carbonate Content.....	ASTM D 4373

III. Quality Control

Quality control checks such as duplicates and spikes (QC samples), are not normally applicable to geotechnical testing. This is due largely to the inability of obtaining samples with known characteristics, the heterogenous nature of the samples, and quality control procedures built-in to the analytical method.

QC measures to ensure accuracy and precision of test results include the following:

- 100% verification of all numerical results - raw data entries, transcriptions and calculations entered by lab technicians are checked, recalculated and verified. Most data calculations are performed by computer programs.
- Data validation through test reasonableness - summaries of all test results for individual reports are reviewed to determine the overall reasonableness of data and to determine the presence of any data that may be considered outliers.
- Quality control procedures are built into most standardized geotechnical procedures. For example, liquid limit and plastic limit analyses call for re-analyses and specify acceptance criteria.
- Routine instrument calibration - Instruments, gauges and equipment used in testing are calibrated on a routine basis. All instrument calibration follows ASTM or manufacturer guidelines.

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- Maintenance of all past calibration records - calibration records and certification documents of all instruments, gauges and equipment are updated routinely and maintained in the Quality Control Coordinators Quality/Operations files.
- Certified and trained personnel - all technicians are certified by the National Institute for Certification of Engineering Technicians (NICET) in geotechnical soil testing, and are trained in the application of standard laboratory procedures for geotechnical analyses as well as the quality assurance measures implemented by Shaw.
- Quantitative analyses frequently used in geotechnical/physical testing programs do not use QC tools common to wet chemistry or radiochemistry laboratories. Measures not employed in the analysis of samples reported in this report include: laboratory control samples (LCS), blanks, matrix spikes (MS), duplicate analyses, dilutions, digestions, correction factors, surrogate sample analyses, detection limit determinations, control charts, and/or tentatively identified compounds (TICs).

IV. Data Qualification

None.

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Appendix A
Sample Cross-Reference List

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Stephen Trent
Fluor Hanford, Inc.
Shaw Project Name: Eberline Hanford
Shaw Project No. 100846.50000000
SDG No. H2914

**Shaw Geotechnical
Laboratory
Oak Ridge TN
(865) 482-6497**

SAMPLE NUMBER CROSS-REFERENCE LIST

LAB SAMPLE NO.	CLIENT SAMPLE NO.	MATRIX
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BC0518	B1BR60	Soil
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Appendix B
Sample Test Results

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100846.50000000

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Moisture content calculated by ASTM D 2216 based on sample dry weight.

Bulk density is the weight of wet sample divided by the volume of the wet sample (as-received).

Dry density is the weight of the dry sample solids divided by the volume of the original sample.

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**PARTICLE-SIZE DISTRIBUTION
 ASTM D 422**

Project Name Eberline Hanford

Field Sample No. B1BR60

Project No. 100846.50000000

Lab Sample No. BC0518

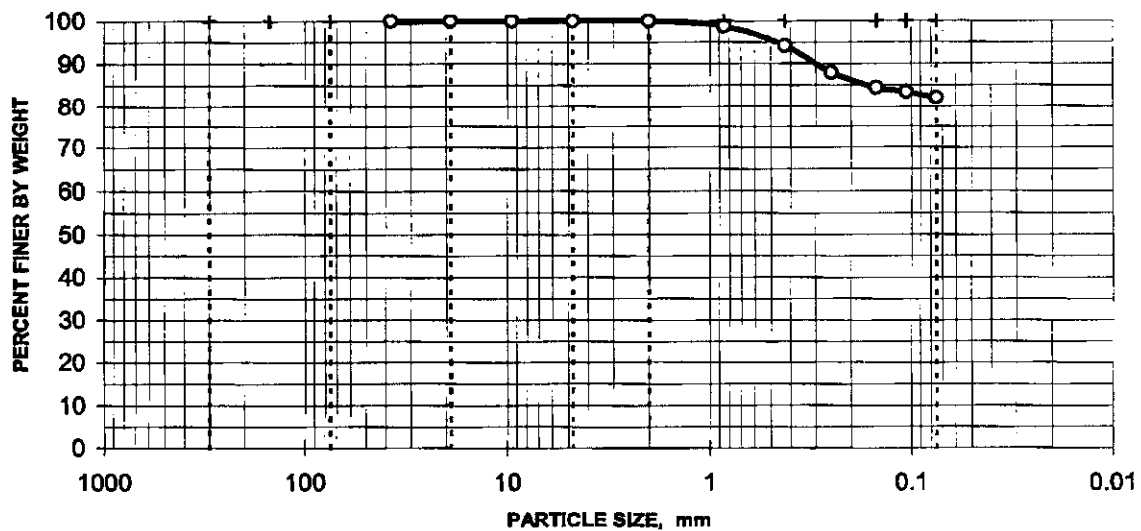
Moisture Content = 39.2%
 based on dry sample weight

SIEVE ANALYSIS

C O A R S E	Sieve No.	Diameter mm	Percent Finer
	3"	75.000	100.0%
	1.5"	37.500	100.0%
	0.75"	19.000	100.0%
	0.375"	9.500	100.0%
	#4	4.750	100.0%
	#10	2.000	100.0%

F I N E	Sieve No.	Diameter mm	Percent Finer
	#20	0.850	98.7%
	#40	0.425	94.2%
	#60	0.250	87.9%
	#100	0.149	84.3%
	#140	0.106	83.4%
	#200	0.075	82.0%

DISTRIBUTION CURVE



0.0% Gravel

18.0% Sand

82.0% Silt/Clay

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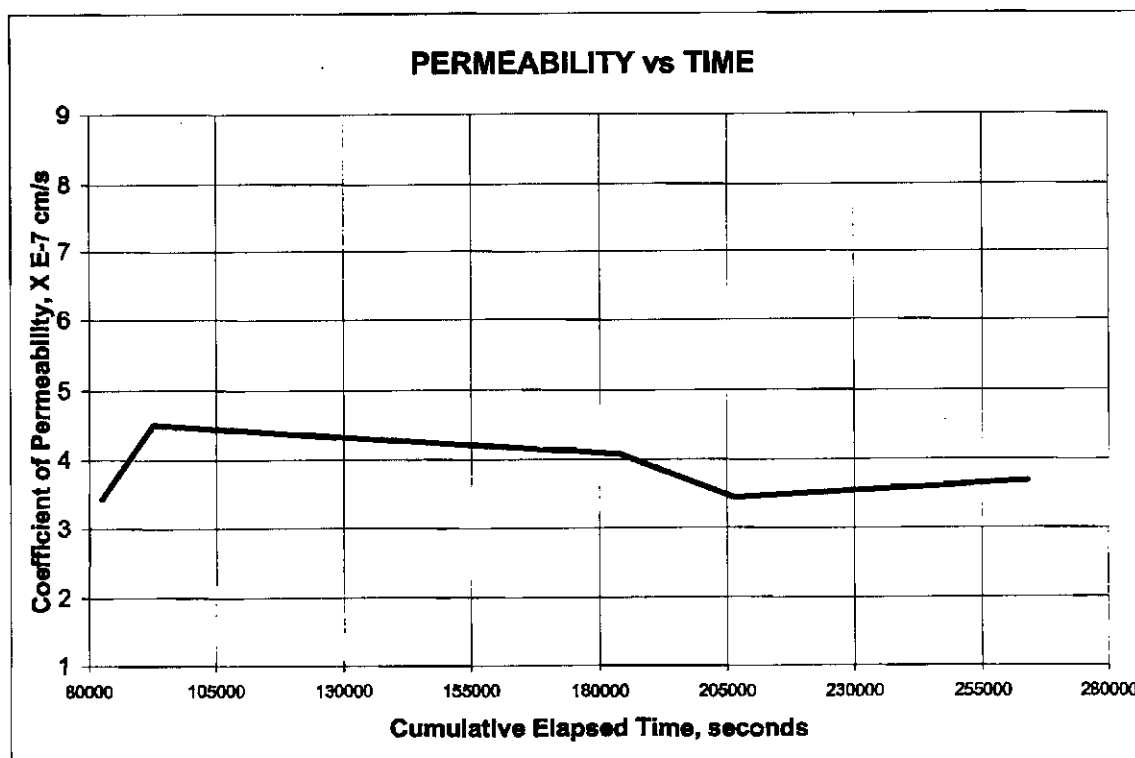
**HYDRAULIC CONDUCTIVITY / PERMEABILITY
 ASTM D 5084**

PROJECT NAME: Eberline Hanford
 PROJECT NO. 100846.50000000

CLIENT SAMPLE NO. B1BR60
 LAB SAMPLE NO. BC0518

	INITIAL	FINAL		
Specimen diameter, cm	6.38		Hydraulic gradient	17.3
Specimen length, cm	8.15		Min. consolidation stress, psi	2.0
Wet weight of specimen, g.	457.79		Max. consolidation stress, psi	4.0
Specimen cross-sect. area, cm ²	32.01		Total backpressure, psi	8.0
Water content, %	39.2			
Wet unit weight, pcf	109.6		Permeant Fluid	Deaired DI Water
Dry unit weight, pcf	78.7			
Degree of saturation, %	94.2			
Specific gravity of solids	2.65			

Coefficient of Permeability, cm/s 3.9E-07



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SDG No. H2914

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**SPECIFIC GRAVITY
ASTM D 854**

PROJECT NAME:
Eberline Hanford

PROJECT NUMBER:
100846.50000000

LAB SAMPLE NO.	CLIENT SAMPLE NO.	SPECIFIC GRAVITY
BC0518	B1BR60	2.7638

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PROJECT NUMBER:
100846.50000000

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Appendix C
Chain-of-Custody and Request-for-Analysis Records

Fluor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST						F04-033-028	PAGE 1	OF 1	
COLLECTOR Alexander/Gent/Thomas		COMPANY CONTACT TRENT, SJ		TELEPHONE NO. 373-5869		PROJECT COORDINATOR TRENT, SJ		PRICE CODE 8N	DATA TURNAROUND 45 Days / 45 Days		
SAMPLING LOCATION 200-ZP-1/C4301/435-440 ft		PROJECT DESIGNATION 200-ZP-1 Characterization Sampling and Analysis - Soil		SAF NO. F04-033		AIR QUALITY <input type="checkbox"/>					
ICE CHEST NO. APP-03-009		FIELD LOGBOOK NO.		COA 119325ES10		METHOD OF SHIPMENT Federal Express					
SHIPPED TO Shaw Group		OFFSITE PROPERTY NO. SU PTK 14598		BILL OF LADING/ATA REF. NO. SU PTK 14598							
MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS	PRESERVATION	TYPE OF CONTAINER	NO. OF CONTAINER(S)	VOLUME	SAMPLE ANALYSIS					
A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	Rad into BIRCS EDGE H2914	None	Split Spoon Liner	2	1000g	SEE ITEM (1) IN SPECIAL INSTRUCTIONS					
SPECIAL HANDLING AND/OR STORAGE											
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME								
BIBR60	SOIL	12/15/04	1645	X							
BC 0518											
CHAIN OF POSSESSION		SIGN/ PRINT NAMES				SPECIAL INSTRUCTIONS					
RELINQUISHED BY/REMOVED FROM PMGENT/AMGENT		DATE/TIME 12/15/04		RECEIVED BY/STORED IN REFRIG #1		DATE/TIME 12/15/04		(1) Bulk Density - D2937; Particle Size (Dry Sieve) - D422; Calcium Carbonate Content; Saturated Hydraulic Conductivity; Particle Density - DB54;			
RELINQUISHED BY/REMOVED FROM PMGENT/AMGENT		DATE/TIME 12/15/04		RECEIVED BY/STORED IN REFRIG #1		DATE/TIME 12/15/04		#1 GW = 2.683 KG			
RELINQUISHED BY/REMOVED FROM PMGENT/AMGENT		DATE/TIME 12/15/04		RECEIVED BY/STORED IN REFRIG #1		DATE/TIME 12/15/04		#3 GW = 2.876 KG			
RELINQUISHED BY/REMOVED FROM PMGENT/AMGENT		DATE/TIME 12/15/04		RECEIVED BY/STORED IN REFRIG #1		DATE/TIME 12/15/04		TO SHAW LAB			
RELINQUISHED BY/REMOVED FROM PMGENT/AMGENT		DATE/TIME 12/15/04		RECEIVED BY/STORED IN REFRIG #1		DATE/TIME 12/15/04					
RELINQUISHED BY/REMOVED FROM PMGENT/AMGENT		DATE/TIME 12/15/04		RECEIVED BY/STORED IN REFRIG #1		DATE/TIME 12/15/04					
RELINQUISHED BY/REMOVED FROM PMGENT/AMGENT		DATE/TIME 12/15/04		RECEIVED BY/STORED IN REFRIG #1		DATE/TIME 12/15/04					
RELINQUISHED BY/REMOVED FROM PMGENT/AMGENT		DATE/TIME 12/15/04		RECEIVED BY/STORED IN REFRIG #1		DATE/TIME 12/15/04					
LABORATORY SECTION		RECEIVED BY Shaw		DATE/TIME 12/28/04 @ 1030		TITLE @ 1030					
FINAL SAMPLE DISPOSITION		DISPOSAL METHOD		DISPOSED BY		DATE/TIME					

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SDG# H2914

Eberline Srvces

CHAIN OF CUSTODY

ORD # R4-12-219

12/21/04 14:23:47

WORK ID: SAF# F04-033 SDG H2914

RCVD: 12/20/04 DUR: 02/03/05

KEEP: 02/03/06 DISP: S

DASH SAMPLE IDENTIFICATION

STORED

TESTS

01A-S B1BR60

HAW

DISPOS

E329S

E331S

E335S

E342S

E345S

BC 0518

RELEASED BY

DATE

TRANSFERRED TO

DATE

RECEIVED BY

DATE

Andreas

12/24/04

Shawn

12/24/04

[Signature]

12/25/04

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